Rapanda Streaming Accelerator

Real-time Streaming FPGA Acceleration

XILINX® ALVEO™

- Big Data Streaming and Machine Learning Acceleration
- FPGA Load Balancer enables working with multiple streaming pipes
- Application Transparency

INTRODUCTION

Analysis of real-time data stream becomes a must have, time-to-value differentiator, in many domains including Finance, AdTech, Security, etc. Volumes of events increase due to IoT events, Clickstreams, etc. causing to Event Tsunami. Existing systems fail to keep up, running into throughput and latency issues. Rapanda helps organizations to accelerate stream processing:

- Improving throughput to achieve 1 Billion events/sec (170x) on a single FPGA Node/Server
- Reducing latencies for lightspeed real-time analytics for latency sensitive application

Rapanda provides acceleration for Big Data streaming processing and Machine Learning facing coming Event Tsunami.

KEY BENEFITS

- 1 Billion events/sec (170x throughput)
- 1 microsecond fixed latency
- Compile from high level application description

SOLUTION OVERVIEW

Rapanda provides inline end-to-end Streaming Pipes running on a FPGA. The data-path runs on the FPGA while control and management are kept by the CPU. FPGAs are available as a commodity cloud instances part of today's major cloud providers (e.g. AWS, Azure, and Alibaba) and are integrated with SmartNICs (e.g. Xilinx® Alveo™ U50).
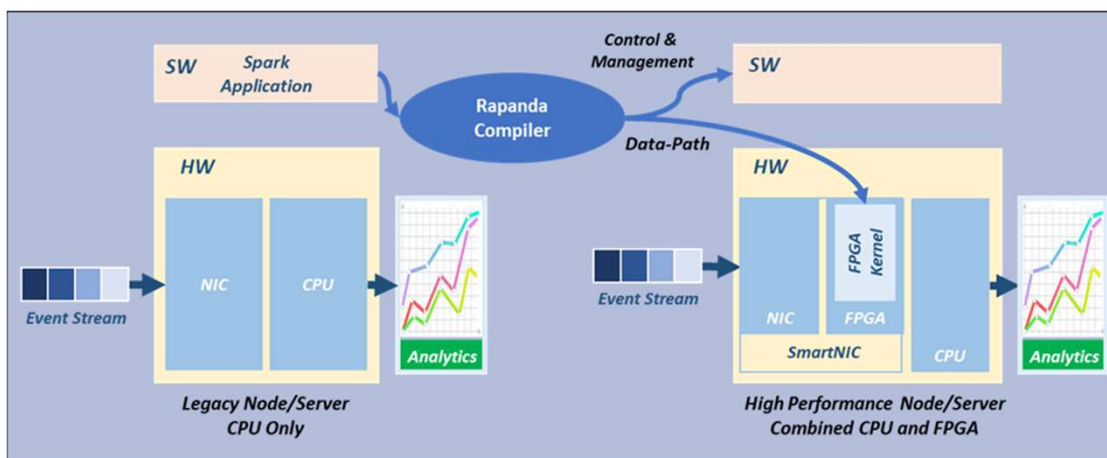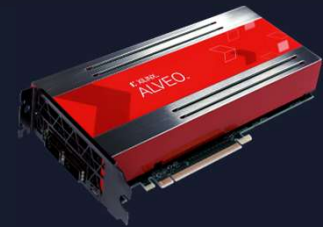

Figure 1 Streaming Application Developed for CPU is Offloaded to CPU-FPGA by Rapanda

Utilizing SmartNICs, the end-to-end Streaming Pipe processing doesn't use the CPU. Rapanda's product can be integrated with existing environments but can run in standalone mode as well. In addition, it can be used on-prem or utilizing FPGA cloud instances and cloud edge instances.

SOLUTION DETAILS

Rapanda maps high level streaming transformations (parsing, filter, select, join, etc.) and analytics to a FPGA kernel. There are multiple pipe stage transformations within a streaming pipes. The system is able to run multiple streaming pipes in parallel at high throughput and low-fixed latency. Rapanda compiler enables application transparency.
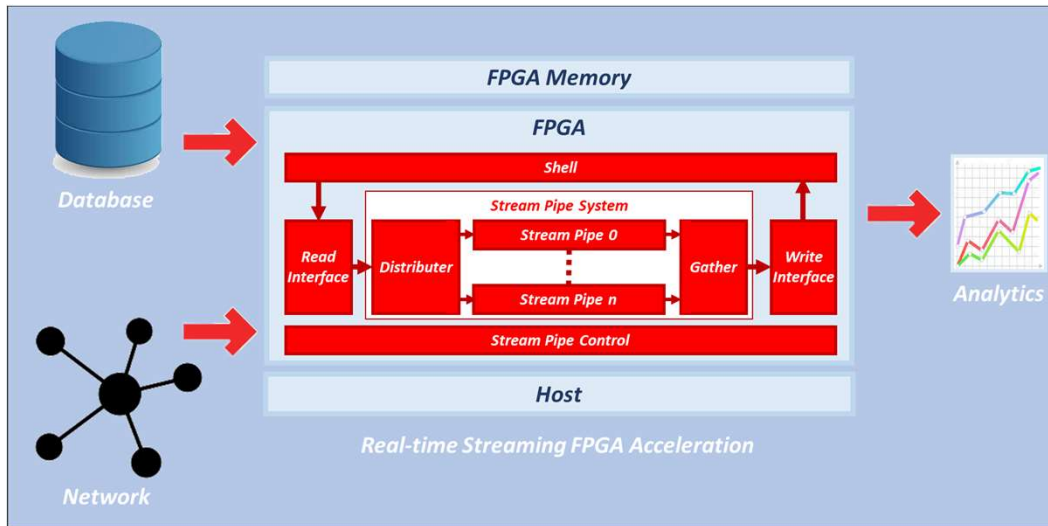

Figure 2 Rapanda maps streaming transformation pipes to a FPGA kernel

RESULTS

Running Yahoo's streaming benchmark by Rapanda's technology achieves:
- 1 Billion events/sec with a single FPGA card
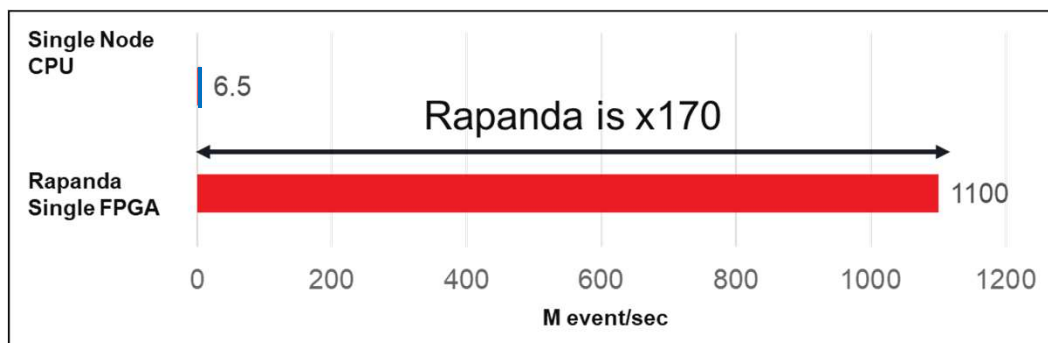- Less than 1 microsecond pipeline latency

Figure 3 Rapanda's performance executing Yahoo's Streaming Benchmark

TAKE THE NEXT STEP

Learn more about Xilinx Alveo accelerator cards
Learn more about Rapanda www.rapanda.io
For more information email us info@rapanda.io